ELECTRICAL EDUCATION

HERETOFORE GERMANY HAS TAKEN LEAD IN THIS LINE.

Now an American Laboratory Will Attempt Great Things—Different Methods Adopted.

BOSTON, Sept. 13.—During the summer what promises to be in many important respects the finest laboratory of electrical engineering in the world has been going up in the Back Bay district of this city; a wide, one-story brick structure, the interest of which does not stop with the students of the Massachusetts Institute of Technology, for whom it is primarily constructed, but includes every person interested in the opening of the struggle between the United States and Germany for the primacy of modern education.

This struggle, about which Americans are likely to hear a great deal during the next two years, when plans now being formulated in various scientific centers are more fully under way, starts with a generally admitted German supremacy. In electrical engineering, the German Empire, with its splendid laboratories at Carlsruhe, Darmstadt and Charlottenburg, to say nothing of the great laboratory now being planned at Aix la Chapelle, is the world's center for exact, scientific work. Neither France nor Great Brtain has anything to compare with these great German institutions, and the Reichsanstalt, the Imperial Physico-Technical Institution at Charlottenburg, is the court of last resort for the whole civilized world in all matters pertaining to the standards of measurement for the various electrical processes. That an American institution is to have a laboratory equal and probably superior to any of its German rivals is therefore a matter of no little moment.

The history of the new American laboratory is typical of the difference between American and German methods. Germany moves slowly toward any ultimate accomplishment. The German, one might say, smokes his cumbersome national pipe, meditates an achievement and builds the result, whether a laboratory or a system of philosophy, so thoroughly that neither stone nor a sentence can easily be altered under a long period of years. The American, on the other hand, smokes a short briar and builds while he smokes; and if time and tide call for change is cheerfully willing to rebuild the following year. He goes for inspiration to the actual workshop where the exigencies of the world's work compel constant adoption of the latest and most improved methods. Here in Boston, therefore, the newest educational laboratory in the country is more closely related to the big electrical testing departments at Pittsburg and Schenectady than to the Reichsanstalt. But it will be superior to these great industrial centers in that it will add the two essential features of the German laboratory—a room devoted to the maintenance and investigation of the ultimate standards of electrical measurement, and a series of laboratories for special research.

GERMANS ARE THEORISTS.

The German student is apt to know more about the minute processes of special research than the latest improvements in practical electrical mechanism. On this side of the water the institute has attempted to encourage this closer acquaintance by visits of inspection to the important electrical centers, an educational example of Mahomet going to the mountain. Now the new laboratory provides a way for bringing the mountain to Mahomet. Railroad transportation, big city drays, an electric crane from the street door to a system of tracks connecting with the lecture hall, and, above all, the modern spirit of co-operation between the important technical school and the great manufacturing establishment, are combined to accomplish the miracle. It will be possible to take a new dynamo direct from any given factory to the laboratory of the institute, transport it by machinery into the lecture hall, use it to illustrate a lecture, carry it back into the power house, set it up on a metal floor especially provided for such experiments, take it to pieces and examine it in detail, and finally put it together once more and send it back to the factory. The laboratory will thus surmount what has been considered an insurmountable obstacle—the fact that the modern science of applied electricity grows so fast that no educational institution can afford to purchase, often only immediately to discard, each new link in the chain of progression.

The new laboratory is to be named the Augustus Lowell Laboratory of Electrical Engineering, in honor of the services which the late Augustus Lowell rendered to the institute. It is divided into five important working parts—the power room and main laboratory, closely akin to the big commercial institutions; the smaller research rooms, based upon a study of the facilities which the Germans place at the disposal of special research workers; the standardizing room, which is intended to equal or surpass the famous Reichsanstalt; the lecture room, unquestionably the most complete in the world, and finally the workshop, where the mechanicians of the institute will repair and indeed manufacture a great part of the laboratory apparatus. These rooms, grouped in a single large building, covering some 40,000 square feet of land and one story in height, are so lighted by seventy skylights that each has the steady, well diffused light of an artist's studio. The architecture of the building as a whole, except for the picturesque effect of its community of skylights, is quite as simple and practical as that of the actual workshops which have afforded so many suggestions for its interior arrangements.

THE GREAT DYNAMOS.

The power room is naturally the heart of the laboratory. Here at one end of a hall something over 300 feet in length, are the six permanent dynamos, their accompanying engines aggregating over 1,000 horse power, which will furnish current for light, motive power, and experimental service. These permanent dynamos have their own place at the far end of the power room where the "song of the piston," still waiting to be translated into English, will not disturb the routine of experimental work to which the rest of the room is devoted. The actual experimental work—that is to say, the testing of all kinds of electrical apparatus in all their infinite multiplicity of detail—will be conducted by means of a large number of smaller dynamos which a ten-ton overhead crane, running from one end of the hall to the other, will carry back and forth as different experiments may call for them.

But what is the actual meaning of the experiments to be conducted in this enormous laboratory? What, in short, is meant by "testing" electrical apparatus? For answer imagine, say, that you have a coal pile which is to be transformed into the familiar light of an electric lamp. Your coal is used primarily to run a boiler which converts into steam about 70 per cent. of the energy of the original coal. An engine then hands on some 12 per cent. of this 70 per cent. of coal energy to a dynamo; the dynamo turns about 92 per cent. of this 12 per cent. into electrical energy, and only about 90 per cent. of the 92 per cent. of the 12 per cent. of the original 70 is finally delivered to the customer. And of this the arc or incandescent lamp converts only some 5 or 6 per cent. into light. There must be waste all along the line, but if at one stage a greater percentage of energy can be handed on to the next stage you will of course get more illumination for the same quantity of coal. There is but one way to gain this economy—namely, to study every step of the process, to investigate every bit of machinery, in short, to test constantly every bit of mechanism involved from the beginning of the operation to the end. There is no modern scheme of electrical transportation, heating or illuminating into which this testing does not enter, and the fact, indeed, is equally true of the countless processes by which electricity enters into the making of various manufactured products; even, for example, in the bleaching of your cottons or the tanning of your shoe leather.

ILLUSTRATED LECTURES.

Quite as interesting in many ways as the power room is the great lecture room of the new building. An amphitheater seating 300 students, it is connected with the adjoining power room and main laboratory by a system of double tracks, already spoken of, which run like a narrow-guage railroad across the lecture platform. Instead of trains running upon these tracks there will be moving tables for the arrangement of apparatus used in illustrating the lectures. The tables, seven or eight in number, in order that the apparatus of several lectures may be in process of preparation while that of a single one is being exhibited, are 10 by 15 feet in dimensions and give ample space for practically any modern system of light or power transmission to be set up in miniature. In one of the regular institute lectures the subject of transmission of power is illustrated by a reproduction of the system employed in lighting five neighboring cities from a central power house. The illustration reduces everything to scale, in which the students may watch the dynamo of the central station generating the current and sending it along to the different cities. Such an object lesson is necessarily complicated, requiring the services of three men during several hours to set up and five men three-quarters of an hour to take to pieces. As conducted in the past, the process has naturally somewhat interfered with other lectures. In the new hall, however, the illustration, miniature telegraph poles and all, can be prepared outside the hall, moved in by machinery when it is needed, and out again after the lecture is over without at all interrupting the lectures that precede and follow.

STANDARDIZING ROOM.

What will probably interest most persons more than the power room of the lecture room, however, is the standardizing room. Here one gets to the bed rock of electrical engineering—the precision of instruments and the method of measuring them. The United States, curiously enough in view of all we have done in electrical science, has no final authority on electrical standards, although the Bureau of Weights and Measures has recently established at Washington a number of standards of electrical measurement that partly answer the requirements. But we have as yet no bureau for standardizing electrical apparatus that can compare with that of the German Reichsanstalt—"the top stone," as it has been called, "of Germany's scientific"—although the need of such a bureau is generally admitted; not only on the commercial side of electrical engineering, but particularly in the important original work that is being done in our American universities. In planning a standardizing room whose accuracy of work shall equal that of the Reichsanstalt, the Institute of Technology is indirectly supplying such a bureau, not only for its students, but for general reference. It is fairly obvious, for example, that the Brooklyn navy yard will not, as occurred not long ago, be compelled to send to Germany for the "calibration" of a number of incandescent electric lamps to be used in the American navy—one among many examples of the international importance of the great German laboratory.

The exterior simplicity of this latest addition to the greater American laboratories of America has already been noted. It rests upon permanent foundations, yet is so simply constructed that it could be torn down and rebuilt without incurring any serious waste of money. The expenditure has gone just where the institute authorities believe it will do the most good; not into massive masonry, but into electrical equipment and perfect accommodation of students. Some of the German universities are already hampered by buildings too well built architecturally to be economically remodeled to accommodate some of the more modern laboratory machinery. Nor is it difficult to recall, even in this country, many instances where educational institutions are cut off from half their usefulness by heavy investments in buildings made almost obsolete by unforeseen modern requirements, but which cannot be destroyed without decided qualms of the financial conscience. In building its new laboratory, in a word, the institute has combined not only the past of the German institutions, and the present of the American industrial plant, but the problematical future that may demand an arrangement quite unforeseen and different from anything now in existence.

PENNSYLVANIA MILITIA COMMANDER

GEN. JOHN P. S. GOBIN

General Gobin is one of the best known militia officers in the country. He is in command of the troops on duty in the anthracite mining region. The general was formerly commander-in-chief of the Grand Army of the Republic.

MAY 7 AT ST. PIERRE.

Prudent Capt. Leboffe's Flight from the Overhanging Doom.

George Kennan, in the Outlook.

The local newspaper said, on the very eve of the catastrophe: "Mont Pelee is no more to be feared by St. Pierre than Vesuvius is feared by Naples. We confess that we cannot understand this panic. Where could one be better off than at St. Pierre?"

Some observers, however, who were familiar with Vesuvius, took a different view. In the roadstead off the city lay at anchor, that very day, the Italian barque Orsolina, Capt. Marino Leboffe, loading with sugar for Havre. Alarmed by the threatening appearance of the volcano, Captain Leboffe went to the shippers and said to them that he did not regard that roadstead as a safe place to be, and that he had decided to stop loading and sail for Havre.

"But," objected the shippers, "you can't go yet; you haven't got half your cargo aboard."

"That doesn't make any difference," replied the captain; "I'd rather sail with half a cargo than run such a risk as a man must run here."

The shippers assured him that Mont Pelee was not dangerous; that it had thrown out smoke and ashes in the same way once before without doing any damage, and that, in all probability, it wouldn't remain active a week. Even if it should, smoke and ashes couldn't hurt anybody.

"I don't know anything about Mont Pelee," said Captain Leboffe, "but if Vesuvius were looking as your volcano looks this morning, I'd get out of Naples; and I'm going to get out of here."

The shippers then became angry and told him that if he sailed without permission and with only half a cargo, he would get no clearance papers, and would be arrested as soon as he reached Havre.

"All right!" replied the imperturbable captain; "I'll take my chance of arrest, but I won't take any chances on that volcano. I'm going to get my anchor up and make sail just as soon as I get aboard." He bade them goodby and left them. The shippers then sent two customs officers to the barque, with instructions to stay on board and prevent her from leaving. The captain said to these officers: "Gentlemen, I'm going to sail from this port in less than an hour. If you want to go ashore, now is your time to do it. If you stay with me, I assure you I shall take you to France."

When the sails were loosed and the crew began to heave up the anchor, the customs officers hailed a passing boat and went ashore, threatening the captain with all the penalties of the law.

Twenty-four hours later the shippers and the customs officers lay dead in the ruins of St. Pierre, and the barque Orsolina was far at sea, on her way to France.

The End of the Quest.

Unarm him here. Now wish him rest.
His was the fate of those who fail;
Who never end the knightly quest,
Nor ever find the Holy Grail.

He was the fiercest lance in all
That virgin honor called to dare;
The courtliest of the knights in hall,
The boldest at the barriere.

Joyful he took the sacred Task
That led him far by flood and field;
His lady's favor at his casque,
God's cross upon his argent shield.

See where the Paynim point has cleft
The crimson cross that could not save!
See where the scimitar has reft
The favor that his lady gave!

For this poor fate he rode so far,
With faith untouched by toil or time;
A perfect knight in press of war,
Stainless before the Mystic Shrine.

One finds the Rose and one the rod;
The weak achieve, the mighty fail;
None knows the dark design but God,
Who made the Knight and made the Grail.

The single eye, the steadfast heart,
The strong endurance of the day,
The patience under wound and smart—
Shall all these utterly decay?

The long adventure resteth here;
His was the lot of those who fail;
Who ride unfouled by sin or fear,
Yet never find the Holy Grail.

—Frank L. Pollock, in Atlantic Monthly.

THE VOICE OF THE PULPIT

THE MASTER: THE PIVOTAL MIND OF WORLD'S RELIGIOUS THOUGHT.

By Rev. John Brittan Clark, D. D., Pastor Westminster Presbyterian Church, Detroit, Mich.

"Ye call me Master and Lord, and ye say well, for so I am."—John, xiii, 13.

I think we will none of us doubt or deny that of all the powers ever in this world with an influence over the mind of humanity Christ's power is easily supreme. Considered solely on its intellectual side I do not know of any thought that has ever been given to the world that has affected the thinking of all ages in a way at all comparable with the thought of Jesus Christ.

Living but three brief years in public and but a short thirty-three years in all, and posterity inheriting but a few fragments of His thinking at the most, we find it utterly impossible, in our search for the truth about what is admittedly the most important part of our being, the spiritual, to go either back to the centuries before Christ, or into the centuries since His birth and death, or to venture into the centuries that we are rushing toward, without being compelled, either willingly or reluctantly, to refer all our thinking to one Man of Nazareth.

Jesus Christ is inevitably the pivotal mind of the world's religious thinking today. This is all the more wonderful when we admit that Christ was not a philosopher in the technical sense of the term; that His thought, as we have it, is not a regular, orderly system of philosophy. There are very few personalities that can so radically control and shape the thinking of mankind. You can count on your two hands—and have fingers to spare—those minds that have made a truly new and indelible and irrefutably true impress on the thought of the world. As time strings the centuries on His girdle they nearly all have the same general luster. Only far apart we catch a new radiance in some one. And amid these very few, those antedating the Nazarene are eclipsed by Him; those succeeding Him catch their color from His. Let none think that I am importing this intellectual meaning into the term Master, for the word in the text is Christ's own word, and that is Teacher.

Christ is the Master because His thought is dynamic, is operative. The great painters are not masters solely because they suggest the proper things in drawing and color and design, but because, in addition to this, they personally carry their principles into execution. When you look upon their paintings you see both the principle of their art and the execution of the principle they advocated. It is so in all directions where mastery is claimed. The master musician is not he who can understand and expound only, but who, with firm and pliant touch, can so well execute what he understands and teaches. We reach here the second indispensable element of mastery—it is to be able to do what you claim the ability to do.

SUPPORTING THE CLAIM.

Apply this test to Jesus Christ; does it not support the claim that He is Master? He taught that self-control was an indispensable requisite for character. Then, as men listened in charmed wonder to His words, they saw this teacher of self-control go among men who offered Him every provocation to retaliate, to lose control of himself, and without one slip or failure exhibit self-control. This teacher from Nazareth held men spellbound by His teaching of self-forgetfulness in behalf of others. Then He walked before them, doing, in instances beyond number, what He had taught, painting, painting with fatigue, exhaustion, poverty, homelessness, and His life blood at last for His pigments, the principle He had presented. This Jesus set men thinking about purity in life and freedom from sin—thinking on higher levels and along loftier lines than men ever had before His time; then He lived before them during thirty-three years a life in which the hostile and microscopic criticism of twenty centuries has failed to find any flaw or fault.

So we may run the thought into all the elements of Christ's teaching. What He expounded He executed. The principles He advocated He applied. He lectured not only, but He lived His lecture. He was the master of thought, and He was the master in vitalizing His thought. This is a very sure evidence of mastership. "I know how it ought to be done, but I cannot do it," we say. Then one steps up and does it as it should be done, and we say: "Ah, but you have mastered it." If this is the test we continually apply to the multitude of lesser things in our life, how supreme appears the mastership of Him who, in this mighty undertaking of living a rigid life, while every man repeats Paul's words, "The good that I would I do not; but the evil which I would not that I do"—steps out before the world and actually so masters the tendencies of the human life which, in common with us all, He felt the inclination to obey, that He actually lives the perfect life—perfect beyond the power of man to find fault in.

We have seen that mastership consists in the combination of masterful thought, and masterful execution, and that this combination is found in Jesus Christ in the most supreme degree. But there is another indispensable element in complete masterliness which I am sure has already occurred to you, namely, the ability to transmit one's own personal power. Certainly this is the supremest test of mastership; this is the rarest possession. The great master is he who knows, who personally can do, and finally who can personally empower others to do.

WHY HE IS MASTER.

Jesus, the Christ, is master because He can and actually does enable every one that puts himself under Him to so overcome his faults, to so develop his power, be it little or much, to so conceive and plan and execute, that the result is amazing to all, and to none more than to the student himself.

Although Christ is Master because of the master thought, the master power to develop His pupils, the astounding fact is that He is never any one's master by irresistible might. He is not a despot. He does not enter any life against its will and crush and beat it down into subjection to Him. This is what some people wish He did do, that He would make them Christians so that they would not have to try to be, but simply could not but be. Nevertheless, that is not Christ's way. No more possible is it to buy instruction from Him. We become pupils of the Master by going to Him in prayer, telling Him we know nothing but want to learn, and that we will put ourselves under His instruction and do what He tells us to do. Then begins the most marvelous training man can have.

Perhaps the very first lesson He will give us is the same lesson that He in the text environment gave His first disciples, namely, the prime essential of mastership is to be able to serve, to reach the mastership by becoming the slave. That almost leaves the novice breathless. It is so revolutionary, so antithetical to all teaching of other masters. Did the Great Master himself do that? You have the record of His life; what shows it?

Perhaps the next lesson will be the suffering of pain. The novice almost rebels. That is so unexpected. Did the Great Master himself become Master in that way? There is the story of His career. What says it? "Made perfect through suffering." The most patent lesson, the most conspicuous fact in the world, is that the few really great in any line have had years of toil and pain and darkness before they heard the world's applause.

He is the Master because He has, in the highest possible sphere of thinking, the spiritual, given the world the supremest thought. He is the Master because He has, in the hardest and noblest sphere of achievement, the sphere of life, given the absolutely faultless execution. He is the Master because He can take the poorest and meanest and least talented of humanity and make them masters together with Him.

THE CAMERA FIENDS.

How They Pester and Victimize People of Prominence.

New York Letter in Washington Star.

J. Pierpont Morgan, a gentleman who, since he achieved his vast prominence in the world of finance, has unquestionably become afflicted with that malady politely termed "the delirium of grandeur"—the affliction is described in less complimentary phrases when applied to ordinary individuals—blusteringly announced on the deck of the steamer that hauled him into New York harbor the other day that he wouldn't have his picture taken by a newspaper photographer "for $5,000,000." That seemed like a pretty fairish bagatelle for immunity from the besiegements of the score or more of newspaper and magazine photographers who hovered about the extremely gruff boss of the financial puddle, but Mr. Morgan might just as well have made his figure rounder by saying $50,000,000. A very busy and self-important secretary of the financier kept himself more or less in front of Mr. Morgan during all of the time the latter was on the deck of the steamer as it came up the harbor, and when, in spite of this, one of the photographers took a shot at the trust organizer, the officious secretary appeared to become real vexed, so he did. He advanced upon the photographer who had got the shot, raising a heavy cane as he advanced.

"Did you photograph Mr. Morgan?" the secretary demanded with as much fierceness as he could assume.

"I sure made as much of a crack at the same as I could with portions of your carcass in the way," dryly replied the photographer.

"How dare you photograph Mr. Morgan?" ferociously inquired the secretary, raising his club as if to smash the camera, and mentioning the financier's name in a tone of awe, as if the juggler of millions were of celestial origin.

"It's part of my graft," calmly replied the photographer, becoming a bit angry himself. "Individually, I don't care any more for Mr. Morgan than I do for Paddy the Pig or Grand Central Pete, but I drifted on board this craft for the purpose of getting a view or so of his frame. I've got one, and I'm going to get some others before he gets off the boat. As for you, I'd recommend you to fetch that club of yours to a parade rest real quick, or I'll just take you by the slack of your waistcoat and toss you over the side, even if you were the secretary to four Morgans and a couple of Ahkounds of Swat besides—that's what I'll do with you, Willie."

The important secretary subsided promptly, and Mr. Morgan rushed to the purser's room to get away from the camera. They all caught him with their lenses as he started on his dog-trot, and, with one leg in the air and his yachting cap pulled down over one ear, the eminent financier in these pictures—which were published the next day—only needed a cutlass between his teeth to resemble a glass-eating and sulphur-burning pirate of the Spanish main as depicted by Howard Pyle.

Then they all went down in a body to the purser's room, where Mr. Morgan had taken refuge. They found him seated in a corner of the room, which, nevertheless, was in a strong light, and very well adapted for photographic purposes. The great money man was tilted back in a chair, growling angrily, with a cigar clapped into his countenance at the precise angle affected by Chuck Conners, One-eyed Connolly and others of that tribe—which is a little eccentricity of the eminent financier's.

One by one the photographers passed before the door of the purser's room, shooting away at the wrathful looking organizer of everything, and the portraits that they thus secured made Mr. Morgan look for all the world like a sullen mastiff just about to make a final effort to chew his tethering rope. Before Mr. Morgan became aware of what they were doing and kicked the purser's door to all of them had taken these horrible negatives of him.

The notable women who, arriving from Europe during the past fortnight, ineffectually strove to escape the cameras, were rewarded for these efforts by having snap shots of themselves published in the yellows that made them look like composites of washerwomen, gypsies and chorus girls. The Vanderbilt party tried to keep newspapers, handkerchiefs, parcels and all sorts of things before their faces as they stood upon the pier upon the morning of their arrival, but the photographers, not to be thwarted, buzzed around them like bumblebees, and all succeeded in snap-shooting the women of the party in the most grotesque and absurd attitudes.

The Duchess of Marlborough was in particular the victim of the newspaper cameras. Now, the Duchess of Marlborough is not a pretty woman. She is very far from that, and all of the idealized portraits of her made by French painters and published in the Sunday supplements of the New York yellows will never make her a pretty woman. But she is at least presentable, albeit her figure is slender to the point of emaciation, and her countenance is in no wise interesting. But the snap shots that were taken of the unfortunate American duchess by the newspaper camera clickers simply made her out a fright of the most frightful description, and if she saw them she must have wept bitterly over them. The lineaments and figure of her trim mother, Mrs. Belmont, were likewise most wretchedly rendered by the newspaper camera folk, and all because they wriggled about and made such determined efforts—foredoomed to failure—to evade the snap-shooters.

Young Charles Schwab, the president of the big steel outfit, who went to Europe last week to rest up after his physical breakdown, apparently profited by these awful examples as he saw them in the yellow newspapers. As he stood on the pier, chatting with some friends while he waited for his steamer to issue the "All aboard and all ashore" call, he observed the large flock of men with cameras circling about him. He stepped out into an open space with a laugh.

"Here, you boys," he said cheerfully, "fire away—I'll stand up for you. As long as it's bound to be I want to be made to look as human as possible, anyhow."

The result was that the snap-shots published of Mr. Schwab on the following morning did not make him look like a gloomy gorilla or a slouching criminal, but like a cheerful, well-contained man of the world.

Mr. Schwab seemed to have the right end of this photographic business, as the saying goes. The celebrities might just as well stand and deliver to the persons with the cameras. They are inevitably going to be photographed somehow or another, and before long they will unquestionably realize that when they are presented in the picture dailies as freaks, as they have been for a long time now, the joke is on them.

Senator and Wife Never Separated.

Detroit Journal.

When James H. McMillan, the son, died at Colorado Springs early in May, Senator McMillan, the father, was ill and could not leave for the West. So Mrs. McMillan made the trip alone. This was the first time in their forty years of married life that they had ever been separated. Where Mrs. McMillan went the senator accompanied her, and wherever Senator McMillan was called Mrs. McMillan was his companion. Forty years of unbroken companionship is seldom accorded any husband and wife, and those who have visited in the home bear witness to the happy and beautiful life of the household.

Family prayer was a feature of the home life of this family. In spite of multitudinous cares of business and state, the family was regularly called together for prayer and Bible reading by the father. The senator was a member of the Jefferson-avenue Presbyterian Church.

Senator McMillan was the most domestic of men. His home life is to be regarded as appropriately the ideal. His family came first in everything, and there was nothing he loved better than to gather the members around him for little family dinners. Always at Christmas the family gathered, and since the affairs of state have called the senator to Washington if he could not return to Detroit for the Christmas dinner as many of the family as could went there to spend the day with him.

Business cares were never allowed to obtrude in the home. When office hours were over the senator threw off all responsibilities and went in for healthy recreation.